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Electrically Operated Steering Lock Device

BACKGROUND OF THE INVENTION

[0001] The present invention relates to an electrically-operated steering lock device.

[0002] A conventional electrically-operated steering lock device is so designed that, for locking of steering of a vehicle, a lock bolt is protruded toward a steering shaft by biasing force of a spring so as to be engaged with a recessed portion of the steering shaft, by which the steering shaft is locked. Further, an electric motor, which is a lock bolt driving device, is rotationally driven so that the lock bolt engaged with the steering shaft is withdrawn from the recessed portion, by which the steering shaft is unlocked.

[0003] Then, with the steering shaft in a locked state, while a so-called steering wheel torque is applied to the steering shaft, the lock bolt is burdened with a load in a rotational direction of the steering shaft. As a result of this, engagement between the lock bolt and the recessed portion of the steering shaft becomes tighter, thereby making it more difficult for the lock bolt to be removed from the recessed portion.

[0004] Therefore, in such a state, even if the electric motor is rotationally driven, it can occur that the lock bolt will not come out of the recessed portion on account of this load. In this case, after the steering wheel is moved to some extent to release the steering wheel torque, the electric motor is actuated again, thus allowing the lock bolt to come out of the recessed portion. However, for causing the lock bolt to come out of the recessed portion, as shown above, there is a troublesome requirement in that the electric motor is started twice, which can be predicted to lead to a reduction in a service life of the electric motor.

[0005] As a countermeasure for this, an electrically-operated steering lock device described in Japanese Patent No. 3174008 (hereinafter, referred to as "Patent Reference 1") is